

EXHIBIT 51



Rules Ecosystem: The usage of rules technology in insurance value chain

BRCoE foundation framework

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Section Instructions: Use this section to identify changes to the document based on previously released versions of the document.

Version #	Date	Author	Section Modified



1.0 Introduction

1.1 Scope

The purpose of this document is to illustrate how the business and IT stakeholders can leverage rules technology to address the different business needs, such as increasing agility to implement the business change, and reducing time to market the new products and services.

This document also broadly explains the taxonomy of the rules in context of the insurance business and recommends a high level framework to assess the suitability of a business area for rule based implementation. The overall document is structured into 3 sections:

1. Overview of the business rules.
2. High level framework to assess a business area for optimal rule technology usage.
3. Illustration of the business areas in the insurance value chain, where business and IT stakeholders can leverage rule technologies.

1.2 Intended audience

This documented is targeted at business and IT stakeholders empowered to take decisions on introducing new technologies in their respective areas. This document will also help the stakeholders to understand the applicability of the rules technology in solving the different business issues.

1.3 Assumptions

The following assumption is made in the document:

1. The scenarios illustrated in this document are generic and do not represent any particular division, such as CSI, CCI, etc.



2.0 Overview of the Business Rules

2.1 What are business rules

"A business rule is a statement that defines or constrains some aspect of the business. It is intended to assert business structure or to control or influence the behavior of the business." ... a definition of business rules, adopted from 'Business Rules group'.

All business activities rely on some sort of business rules, regardless of the physical implementation – whether a business rule takes the form of a simple written or spoken statement, or is embedded in code as a calculation formula or an algorithm.

Here is a practical example of business rules in the insurance industry:

An insurer may have an underwriting policy that says *"an 'underage applicant' for insurance on ultra-high-performance super cars' is not eligible for coverage."* This policy translates into two set of business rules – a set of rules to define the age criteria for an applicant and the other set of rules to define criteria for a car to qualify as a *'high-performance super car'*.

The underwriter refers these business rules to assess the eligibility of a new application.

Business rules are used almost in all areas in the insurance business and they are mostly derived from enterprise or corporate business policies, calculations and formulas, risk thresholds and regulatory authorizations, and operating procedures, etc.

Traditionally embedded inside code, the common IT implementations of the business rules are inflexible to automated decision management, and lack reusability to solve a known pattern of problems.

Externalizing the business rules to a structured decision management not only increases the flexibility of the certain functionalities in insurance business, but also reduces the overall cost of making decisions for the key business processes.

At a high level, the structured enterprise business rule management will address the following:

1. Enhance business performance by:
 - I. Increasing analytical ability;
 - II. Reducing operational cost.
2. Automate decisions by:
 - I. Automating high volume low risk decisions;
 - II. Establishing uniform decisions across multiple functions, channels and business touch points.



2.2 How the business rules are classified

To manage the different kinds of business rules within a particular business process, the rules are logically grouped – each group addresses the specific concerns.

Based on the high level business objectives of the rules and their association with the logical architectural building blocks, such as Business Process Management (BPM) and Enterprise Decision management (EDM), the insurance business rules can be classified into 10 categories:

Functional rules

1. Product definition: Deals with the initiation, building and integration of new products, and ensures compliance with regulatory requirements.
2. Product configuration: Enforces strict uniformity in product definitions across the enterprise by providing a pre-configured set of rules and templates.
3. Product inventory management: Maintains the product portfolio with appropriate versioning to ensure that the right products are launched / retained / retired based on market inputs.
4. Underwriting: Decides which prospective customers qualify for coverage (and the type of coverage), and quantifies the risk associated with each product.
5. Pricing / Rating: Calculates the premium, or an intermediate value necessary to determine the overall premium for a policy / quote, based on the rate plan.
6. Bill / Invoicing: Determines the billing characteristics (e.g. direct billing, agency billing, etc.) based on policy characteristics.
7. Claims adjudication: Determines the amount to be awarded based on claim characteristics.

Support rules:

8. Predictive analytics: Guides decision making on positioning strategy, promotion strategy, and underwriting strategy, by exploiting patterns in historical and transactional data.
9. Front-end helper and input validation: Facilitates intelligent data collection by ensuring validation at source, and pre-fills data wherever possible, based on user input.
10. Workflow / routing and orchestration: Determines the optimal work breakdown structure and routing across activities in the insurance value chain.



3.0 Applicability of Business rules in the Insurance value chain

A value chain is the sequence of activities that a service goes through, from conceptualization of the products and offerings to delivery of the commitments.

In this section, we will explain the key business concerns of the different areas in an insurance value chain and assess how the rule technologies can address those concerns. This value chain typically includes the specific activities as listed below:

1. Marketing and Sales management: This area focuses on the over all marketing and sale cycle management of the insurance products and the services.
2. New product development: This area focuses on the development and deployment of products to the insurance markets and channels.
3. Underwriting and rating: This area focuses on the underwriting and pricing of products.
4. Policy administration: This area focuses at servicing of policies, book / bind and issuance processes.
5. Customer management: This area focuses at management of customer and producer relationship.
6. Claims: This area focuses at servicing and issuance of claims.
7. Enterprise services: This area focuses the common enterprise services like, content management, call center support, billing across the insurance value chain.



Figure 1 : Insurance value chain

In the subsequent sections, we will analyze these areas to determine the different categories of the business rules used, and how the rule technologies can address the key concerns around these rules.

3.1 Marketing and sales management

The key function of the Product marketing team is to analyze the existing product portfolio and evolving market trends to formulate marketing strategies. The sales process of the insurance business is similar to that of other industries – to attract and retain profitable customers. The sales team defines and executes optimal strategies to stimulate the overall revenue growth in terms of writing premiums and selling new products. A product portfolio defined with product configuration and product inventory management rules enables the Marketing and sales team to analyze the available sales information, market trends / feedbacks, and product portfolio detail to determine the appropriate sales strategies quickly. The following diagram illustrates the different category of business rules used for 'Marketing and Sales management'.





Figure 2 : Business rules used in Marketing and Sales management

The *Marketing and sales management* area in the insurance value chain includes:

1. Determination of appropriate market positioning for conceptualized products: The product marketing team analyzes the product portfolio information stored in the form of product inventory management and product configuration rules to determine the right target segment for a product; arrive at decisions related to the different sales options such as direct to customer, captive agents, or independent intermediaries; or take decisions on re-pricing, factor changes; option changes, etc.
2. Analyze market performance and facilitate faster decision on selling products: It is necessary for an insurance business to accelerate its response to the changes in its competitive landscape i.e. macroeconomic changes, changes in the marketing mix (i.e. product, price, place, and promotion) of competitors, etc. For making accurate decisions, the sales team executes different predictive analyses on the available information and determines the opportunities for revenue growth.
3. Determine strategy to define commissions / sales incentives for the agents and brokers: In order to respond faster to the market needs and establishing relationship with the brokers and agents, the sales team leverages structured, but flexible commission policies (sales incentives, intermediary commissions, etc) defined as pricing rules for the different sales channels. This is necessary to gain more traction in winning share of the sales channel, and to increase the overall sales revenue.
4. Identify cross-sell and up-sell opportunities: While it takes many months, if not years, to recover the cost of acquiring a new insurance customer, the business present in the books for more than a year is more profitable than business that is in its first year of coverage. Therefore, sales teams always opt to leverage the cross-selling / up-selling of their products within the existing customer base and other close-knit groups. They run different predictive analyses on the customer and sales information available across the different SBUs to determine policies and



discounts aiming to promote cross-selling / up-selling, such as lowering premiums for multi-policy households / organizations, etc.

5. Coordinate among 'Product development team', 'Operations', and 'Actuaries': To implement an optimal sales strategy, the sales team closely participates in a workflow with the product development team and the actuaries for validating the sales decisions and making the necessary updates in the product portfolio, and also in the pricing of rules.

3.2 Product development

Key functions of the 'Product development team' are to analyze the existing product portfolio, and evolving market trends, to plan new or enhance existing products that fulfils the business needs and ensures profitable growth.

A product portfolio, managed by the structured product definition, product configuration and product inventory management rules capability enables the Product development teams to carry out their key functions faster and with more precision.

The following diagram illustrates the different category of business rules used for sales management.

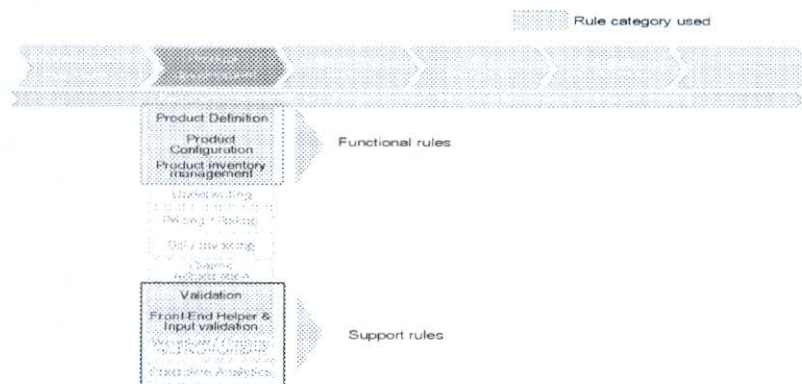


Figure 3: Business rules used in Product development

The key activities that the Product development team performs are:

1. Conceptualization of new products or updating an existing product: An insurance business decides to introduce a new product in response to changes in its macro-environment, such as market competition, corporate changes like mergers and acquisitions, regulatory changes, etc. It may also launch a new product to enter a segment that had been not tapped so far. Similarly, the insurance business may also decide to modify an existing offering to reposition it for a different channel. The product marketing team analyzes the different inputs, such as, forecasted market opportunities and the consolidated information on the existing product portfolio to determine the scope and opportunity of introducing a new product.

2. Development of new products: After conceptualizing a new product, the product development



team defines the pricing model, servicing model, and overall operating strategy of the product. The entire workflow of configuring a new insurance product orchestrates the activities of different groups (such as, document template management, rating, pricing, etc.) participating in the insurance business. During this stage, product managers may run 'what if' scenarios to determine optimal configurations. A structured product configuration framework at this stage enables product managers to reuse existing product components and to store the definitions and data that make up the new product for future recall and reuse. Numerous compliance laws regulate the sale of insurance products, therefore, once a product has been defined, it may require regulatory approval subsequently. Again, a structured product configuration framework enables the configurable workflow routing / orchestration rules and externalizes the product configuration rules to organize the regulatory approval process and tailor it as needed. At the 'Build' phase, the product will be fully configured and integrated with other enterprise systems. Rule based product configuration technology allows for enterprise systems to access product rules and data from the central product repository in real-time. Using a product rule tester, product definitions and rules can be tested before deployment. Again, since data and rules are configured once in a product configurator, testing effort can be greatly reduced. A structured product configuration framework to enable the configurable 'Workflow routing / orchestration rules' and to externalize the 'Product Configuration rules' not only simplifies the process of product configuration, but also significantly reduces the time to market the new products.

3. Manage the product portfolio: Over time, the products and their configurations may need refinement, including repricing, factor changes, option changes, etc. The product inventory management rules necessitate the update of the product information with appropriate versioning to ensure the right product is sold at the right time.

3.3 Underwriting and rating

A key activity of the insurance business is to ensure homogeneity of risk exposure and rate assignment across the book. The principal responsibility of the underwriters is to take decisions on risk selection during policy writing. Underwriters assess risks against a set of selection criteria – referred to as underwriting rules. Underwriters decline a risk that violates one or more underwriting rules, unless they decide to make an exception. Additionally, the regulations stipulated by regulatory authorities, for example, state and federal governments, industry regulators, also govern the underwriting rules and prohibit unfair discriminatory decisions like, redlining, racial profiling, etc. The underwriting rules are applied to the entire policy life cycle for both new business and renewals.



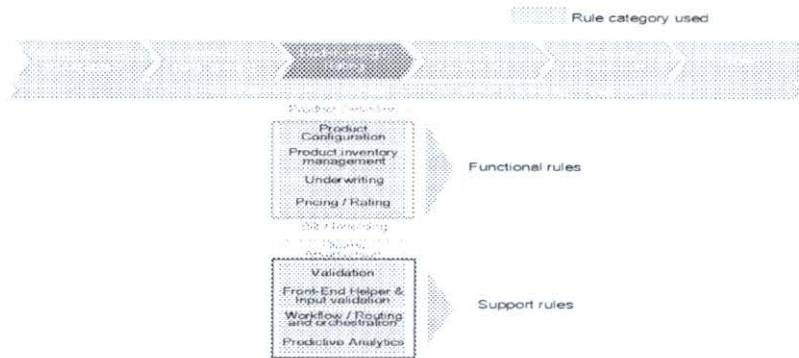


Figure 4 : Business rules used in Underwriting / rating

In order to increase the business bandwidth, the insurance business always attempts to leverage an expert system to automate the underwriting tasks.

The underwriting process is targeted at determining the risks specific to a particular policy within the range defined by the corresponding actuarial risk category.

According to the business volume and categories of the risks that the underwriters assess, the underwriting tasks can be classified into three categories : low risk, low premium, but high volume of business; low-medium risk, low-medium premium, and medium volume of business; and high risk, high premium, but low volume of business (illustrated in the figure 5).

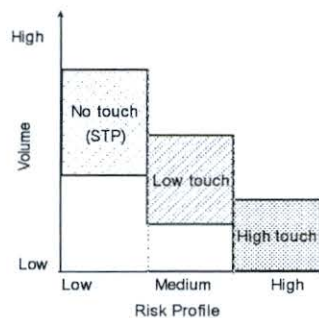


Figure 5 : Applying automated underwriting for high volume segment

The insurance segment characterized by low risk exposure, low premiums, but high volumes of exposure units is represented on the left in the above diagram. A 'No-Touch' approach that uses an automated expert system enables Straight-through-Processing (STP) for this segment. This approach minimizes manual intervention of underwriters' by automating underwriting decisions, on the basis of responses to a standard set of questionnaires or standard set of criteria.



Exactly opposite in characteristics to the above segment is the 'high-touch' segment, represented on the right. This segment involves high-risk exposure, high-premium, but low-volumes. For this segment, the insured event is usually infrequent, but involves significant loss. Underwriters carry out a detailed assessment of the nature of the risk, before deciding to provide coverage. This segment requires very high involvement of underwriters in assessing the nature of risk, and determining premiums.

The 'low-touch' insurance segment, represented in the middle, is characterized by low-medium risk, low-medium premium, and medium volumes. This segment lies between the above two segments, and combines features of both i.e. some of the activities are automated, and a moderate degree of underwriter intervention is also involved.

A direct corollary of high-risk and high-premium business is very low volume of exposure units. High risk-high premium policies are usually associated with relatively infrequent events capable of causing high losses. If the premium is large relative to the amount of protection offered, and the frequency of the event is low, only a small number of people would opt for such policies. Therefore, such a high-risk, high-premium, and high volume scenario is extremely unlikely.

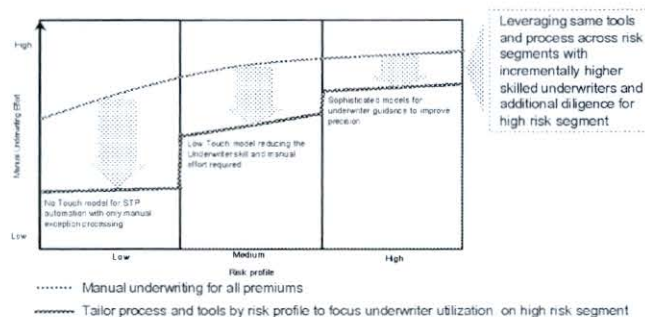


Figure 6 : Automating underwriting process will reduce the underwriting effort

The automation of the underwriting process not only reduces the overall underwriting costs, but also frees up experienced underwriters from low-value tasks. This allows them the bandwidth to devote more to the writing of high risk, high premium policies, that carry a higher 'underwriting spread'. The figure 6 illustrates the cost saving that accrues from freeing up underwriters' time in dealing with low-premium high-volume policies, and utilizing them more profitably in the high-risk, high-premium segment.

The underwriting rules always work in conjunction with the pricing rules. The actuaries leverage mathematical or adaptive models to calculate the rates for the insurance products. They consider different aspects like various regulatory constraints to ensure the accuracy of the models. The underlying principle of actuarial ratemaking that influences an underwriter writing a policy is that a bad risk is under priced risk. Thus, the key objective of the actuaries is always to create models consisting structured pricing rules that balance the product pricing adequately with market and regulatory considerations. Due to variations in the regulatory needs and changing market factors, the actuaries often revise the rates for the insurance products through out the year. They change the modeling



parameters and execute predictive analyses on the product pricing and performance information to fine tune the mathematical model.

3.4 Policy administration

In the overall insurance value chain, policy administration is another key business area, where high operational efficiency ensures the customer's satisfaction and also contributes to profitable growth.

Each policy, once created, goes through the different phases of the life cycle: policy issuance, endorsement, cancellation and reinstatement, renewal, etc.

The policy support personnel work in coordination with customers, broker, agents, and underwriters to make the necessary changes in the policies. The key challenges of this process are to optimize the cost of operation and increase the overall efficiency of the process.

The following diagram illustrates the different category of business rules used for policy administration.

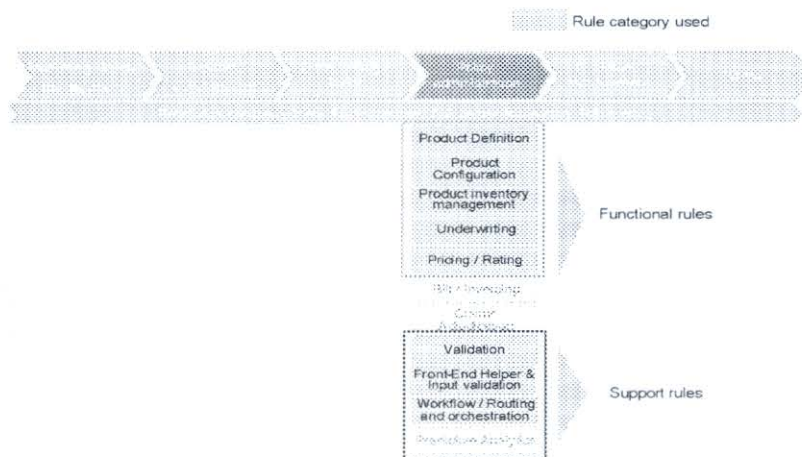


Figure 7: Business rules used in Policy administration

A consistent policy administration process based on 'product definitions rules' and consolidated account information, enables a single view of the policy holder (including coverage, product, claims and the other policy information) for the policy administration teams. Externalizing the information validation rules also enables policy administration process to implement faster changes and to meet the compliance needs.

Additionally, freeing up underwriters from the policy administration helps the business to optimize the underwriter's bandwidth. Thus, structuring a workflow / routing rule framework that can bar the underwriter's involvement in tasks (non-premium bearing policy changes) that do not require manual underwriting.

3.5 Customer management

Customer management – the fine art of retaining profitable customers, and cultivating long-term



relationships – is one of the most important aspects of the insurance value chain. Customer management involves managing detailed information about individual customers and maximizing customer loyalty by carefully handling all customer touch points through the effective use of individual account information.

Some of the activities that fall under the purview of customer management cover areas that are common to Marketing and sales management. Its unique focus, however, is on understanding the value of each individual customer to the organization, and how to manage the customer as a strategic asset to increase overall firm value for shareholders.

The following diagram illustrates the different category of business rules used for customer management.

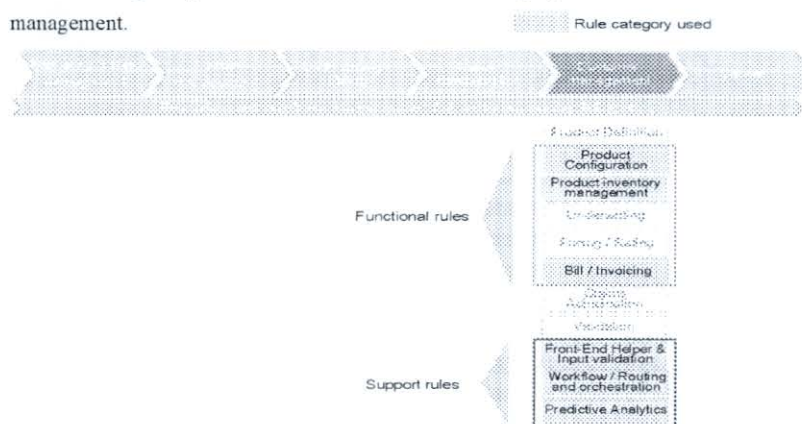


Figure 8 : Business rules used in Customer management

Some of the key responsibilities or focus of the *customer management* team are listed below:

1. Manage customer communication and customize services and messages for each customer: The sales management team helps to create strong bonds with customers by providing customized updates on market movements and analysts' recommendations to the device of the customer's choice. The customer management team also ensures that communication is "two-way" by making it easy for customers to complain or to provide suggestions. Listening is not enough, however, and the customer management team must respond quickly and constructively to any complaint. Predictive analytics tool help customer management teams identify needs of individual customers, track their purchasing patterns, collate past communications, and based on all these provide customized services and personalized services.
2. Enhancing the growth potential of each customer through "share-of-wallet", cross-selling and up-selling: The more involved a customer is with a particular insurer, the more likely he or she is to select the same insurer for other insurance needs. However, in a marketplace in which customers are smarter, more price conscious, more demanding, and are approached by many more competitors with equal or better offers, promoting cross-selling and up-selling is often a daunting



task. To meet this challenge, predictive analytics tools are used by customer management teams to organize and leverage information about customers / prospects for contacting, transacting, increase longevity of customer relationships, and arouse their interest in other offerings / products. The goal is to convert prospects into first-time customers, and then into repeat customers, and then into clients – the people to whom the insurer gives very special and knowledgeable treatment – and finally into advocates, customers who enthusiastically recommend the company and its offerings to others.

3. Estimate customer lifetime value and tailor offerings accordingly: Customer management teams perform Activity Based Costing (ABC) and determine customer lifetime value i.e., net present value of all future profits coming from purchases, margin levels, and referrals, less customer-specific servicing costs, using predictive analytics rules. This helps them prioritize and proportionately spend more effort on its Most Valuable Customers (MVCs).

3.6 Claims processing

Claims processing takes place when insurers fulfill their responsibility of indemnifying the policy holders. A negative experience, such as sluggish processing, significantly impacts the customer retention and future business prospects.

On the other hand, claim processing is also crucial for maintaining the financial balance, as the claim payment is one of the most significant sources of cash outflow and it also presents the greatest opportunity for financial fraud.

The key challenges for the insurer is not only to improve the operational efficiency of claim processing, but also to increase the accuracy of the claim processing, and to minimize the impact of claims on the company's financial results.

The key functions of the *claims processing* are to investigate filed claims, determine whether the customer's insurance policy covers the claimed loss and how much of the loss should be paid to the claimant, negotiate settlements, and authorize payments to claimants, all the while mindful not to violate the claimant's rights under Federal and State laws. The following diagram illustrates the different category of business rules used for claims processing.

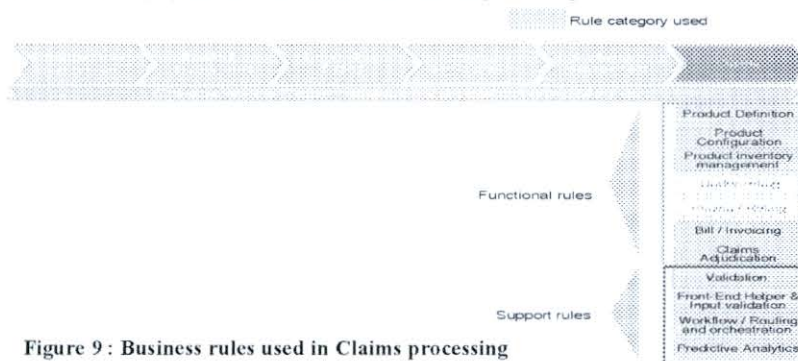


Figure 9 : Business rules used in Claims processing



The key activities that the claims processing team performs are:

1. **Claim adjustment:** Claims adjusters investigate claims by interviewing the claimant and witnesses, consulting police and hospital records, if necessary, and inspecting property damage to determine the extent of the company's liability. They may also find it necessary to consult with other professionals, such as accountants, architects, construction workers, engineers, lawyers, and physicians, who can offer a more expert evaluation of a claim. All the filed claims are centralized in a claims center, and claim adjusters use claims adjudication rules to determine the insurers' liability. If the liability assessment made by the claim adjuster is not contested by the claimant, billing / invoicing rules are used to make an outright payment. If the assessed claim is contested, appropriate workflow / routing and orchestration rules are used to redirect it to a senior level.
2. **Claims examination:** Claims examiners review the claims submitted to ensure that proper guidelines have been followed, and ascertain whether the claimed costs are reasonable given the event leading to the claim. Validation rules are used to check claims for completeness and accuracy and ensure that all regulatory requirements and guidelines have been followed. Predictive analytics are used to analyze historical data, and determine whether the claimed costs are reasonable given the circumstances.
3. **Background investigation:** Claims investigators carry out background checks to ensure that no fraudulent or criminal activity, such as arson, falsified workers' disability claims, staged accidents, or unnecessary medical treatments, has taken place. Claims investigators perform a database search to obtain background information on claimants and use predictive analytics rules to collate and cross-check the records found, such as social security numbers, aliases, drivers' license numbers, addresses, phone numbers, criminal records, and past claims histories, etc.

3.7 Enterprise services

Enterprise services serve all areas across the insurance value chain, providing services like, content management, call center support, billing, etc. Call center support provides centralized human administrative services for all members in the insurance value chain for both incoming queries like, product support or information enquiries from consumers, and outgoing calls to support telemarketing, product promotion, debt collection, etc. Content management helps all stakeholders in the insurance value chain create, update, publish, translate, archive and retrieve reusable digital content in a collaborative manner through all the phases of the insurance value chain.



3.8 Summary of rule usage across the value chain

The following diagram summarizes the different categories of business rule usage across the different areas in insurance value chain.

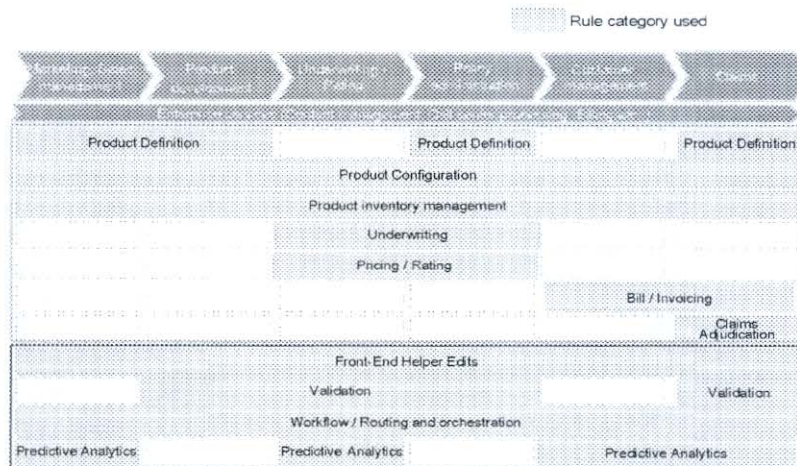


Figure 10 : Business rules used in overall insurance value chain



4.0 Approach to determine the “best fit” rules solution

4.1 Approach to determine the “best fit” rules solution

Although almost all areas in insurance value chain leverage business rules, the selection of rule technologies should specifically focus on the needs of the particular business area under consideration, and the enterprise architecture guidelines.

A 3-step approach to identify the rule technologies for a specific scenario is recommended in this section.

- 1 Step 1: Identify the value chain activities and rule categories relevant to the scenario (refer to section 3 for details)
- 1 Step 2: Determine the candidate rules solutions for the following categories based on enterprise architecture guidelines:
 - o Enterprise Decision Management (EDM) tool (e.g. Blaze Advisor)
 - o Purpose built package with rules features (e.g. FJA, Process Server, Database)
 - o Custom coded solution (e.g. Java, .Net, COBOL)
- 1 Step 3: Determine the best fit rules solution category from the initial hypothesis set on the basis of a score-card driven analysis. The score card focuses on 3 key dimensions to determine the solution category, based on a decision table approach. A score for each dimension is arrived at using the weighted average of the ratings of a series of datapoints. The current score card decision model is based on industry trends and limited Blaze implementation experience within Chubb. The score card will evolve as more feedback from projects leveraging business rules are factored in, and as additional data points are included in the decision model. The three dimensions used to determine the solution category are:
 - o Agility (need for precision configurability to dynamically manage changes in externalized business logic, versus, traditional software development cycles for enhancing code)
 - o Complexity (need for sophisticated decision modeling, versus, basic condition checks and look-ups)
 - o Flexibility (need for generic BRMS, versus, purpose built package with rules feature or parameterized custom-code).

Conduct due-diligence for product selection with the help of the BRCoE and architecture teams. A due-diligence is specially recommended for steps, where the score card analysis recommends a combination of alternative choices among the candidate options.



The areas for due diligence analysis would involve the following:

- Total cost of ownership or Life time cost, which includes the initial cost and maintenance cost
- Synergies derived from past implementations, or other ongoing projects, such as re-use
- Project constraints
 - Budget
 - Resource availability
 - Implementation schedule.

4.2 Score card model

The 3 key dimensions in the scorecard model are evaluated on the basis of specific questions for which, the ratings can be applied on a scale of 1 to 5. The ratings of these individual data points are then summarized using a weighted average method to determine the score for the dimension.

4.2.1. Analysis dimensions

The '**Agility**' dimension rates the need for precise configuration capabilities to manage changes in externalized business logic, vis-à-vis, a traditional software development cycle for enhancing code. The typical questions used to evaluate this dimension are:

- 1 Frequency of changing the decision strategy: 'low' for static rules that change less than once a year on an average and 'high' for rules that require changes to be implemented every week or month.
- 1 Turnaround time for implementing change: 'low' for quarterly release cycles, and 'high' for changes to be implemented early (can be in real time or in a week time frame).
- 1 Need for Business to review or simulate the effect of change prior to install (business cannot go through the code base): 'low' for cases where business does not need to review or simulate the changes e.g., utility functions like file handling, and 'high' for cases where business needs to review and simulate the impact of the changes e.g., changing the pricing structure or commissions.
- 1 Need for System administrators to implement the changes without additional coding: 'low' for the cases, where most changes can go through coding cycles by maintenance teams; 'high' for cases where most changes need to be addressed by system administrators without intervention of developers.
- 1 Need to simulate the effect of changes in decision strategy prior to implementation to optimize the decision: 'low' where simulation is not required and 'high' where simulation is necessary.

The '**Complexity**' dimension rates the need for sophisticated decision modeling, vis-a-vis, basic condition checks and look-ups. The typical questions included in this dimension are:

- 1 Complexity of the decisions: 'low' for simple look-ups and for multiple conditions connected with



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"and", "or" clauses, and conditionals like "If / Then".

- t Transactional volume: 'low' for volumes in the order of hundreds per day, and 'high' for volumes in the order of tens of thousands per day.
- t Impact due to regulatory change: 'high' if major changes are required in decision logic to handle regulatory changes e.g., incorporating additional data points or processing significantly higher volumes, and 'low' otherwise.
- t Use of complex scoring models to drive decisions: 'high' where complex predictive analysis models are used as an integral part of the transaction / decision processing, and 'low' otherwise.
- t Cost or revenue impact of the decision: 'high' when the impact of the decision is great. e.g., reduced losses due to error or fraud, loss of customers business to a competitor, etc.

'Flexibility' rates the need for a generic Business Rule Management System (BRMS), vis-a-vis, purpose built package with rules feature or parameterized custom-code. The typical questions used to evaluate this dimension are:

- t Gap between Chubb business processes requirements and the base functionality provided by purpose built packaged solutions or original custom code design: 'low' where the gap in business process does not require either Business Process Management (BPM) or high package customization, and 'high' where the gap necessitates extensive package customizations and additional custom code, or widespread changes in a custom solution.
- t Custom integration requirement with existing Chubb proprietary applications: 'low' for stand-alone solutions or complete package implementations, and 'high' where Chubb proprietary APIs and message structures are used to stitch together parts of the packaged solution with existing custom applications.
- t Need for extracting and replicating functionality in existing legacy code as externalized business rules: 'low' for implementation of new functionality or current manual processes, and 'high' for legacy modernization projects with minimal functional and business process changes.
- t Need to raise the decision logic across multiple applications: 'high' when the decision logic is to be deployed on new channels or operating environments, and 'low' otherwise.
- t Need for unique or differentiating decision capability not available in industry standard products: 'low' for regulated standardized functions such as financial reporting, and 'high' for unique or groundbreaking services or products not available with competitors.

Additional questions can be added to each dimension based on the scope of the problem, and the scorecard can be tuned by changing the weights assigned to each of the data points. Based on the rating of each individual data point, a score is arrived at for each dimension, and the dimension is evaluated as high, medium or low in importance.



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4.2.2. Solution recommendation

The solution category recommendation is based on the combination of the rating across the three dimensions.

Agility	Complexity	Flexibility	Primary solution	Alternative
High	High	High	EDM	
High	High	Medium	EDM	
High	High	Low	Purpose built package	EDM for complexity and agility
High	Medium	High	EDM	
High	Medium	Medium	Purpose built package	EDM for Agility
High	Medium	Low	Purpose built package	EDM for Agility
High	Low	High	EDM	
High	Low	Medium	Purpose built package	EDM for Agility
High	Low	Low	Purpose built package	EDM for Agility
Medium	High	High	EDM	
Medium	High	Medium	Purpose built package	EDM for complexity
Medium	High	Low	Purpose built package	EDM for complexity
Medium	Medium	High	EDM	
Medium	Medium	Medium	Purpose built package	
Medium	Medium	Low	Purpose built package	
Medium	Low	High	Custom	EDM
Medium	Low	Medium	Purpose built package	
Medium	Low	Low	Purpose built package	
Low	High	High	EDM	
Low	High	Medium	Purpose built package	EDM for complexity
Low	High	Low	Purpose built package	EDM for complexity
Low	Medium	High	Custom	EDM
Low	Medium	Medium	Purpose built package	
Low	Medium	Low	Purpose built package	
Low	Low	High	Custom	EDM
Low	Low	Medium	Purpose built package	
Low	Low	Low	Purpose built package	

Figure 11 : Decision Table

- 1 EDM is recommended as the best fit solution in scenarios where a degree of flexibility is required, and which makes it less suitable for a purpose built solution, along with a high rating in agility or complexity which makes it difficult to maintain a custom solution. The above grid highlights the 6 scenarios where the score-card recommends EDM as the only best fit solution.
- 1 Purpose built solution packages are recommended as a best fit solution option for cases where the ratings for all the three dimensions are in the medium to low range. The above grid highlights the 8 scenarios where the score-card recommends EDM as the only best fit solution.
- 1 A combination of purpose built solution packages with EDM as a supplementary or alternative technology is recommended where the agility or complexity is high and the flexibility is medium / low. The following grid highlights the eight scenarios where the score-card recommends a combination of EDM and a purpose built solution. These scenarios require additional diligence to determine the scope of the EDM versus the purpose built solution.
- 1 A custom solution is recommended as an alternative to EDM for only limited cases where both the agility and the complexity requirements are low, while the flexibility is rating is high. The



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flexibility option makes it difficult to implement a purpose built option. The low rating for complexity and agility makes it viable for implementing using a custom coded solution.



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5.0 Illustrative scenarios for determining best fit rules solutions

This section uses the 3-step approach (introduced in section 4) to arrive at the best fit rules solution for the different areas in the insurance value chain.

5.1 Functional rules

This section will illustrate the optimal solutions to implement the 4 key rule categories that are leveraged in the 6 different areas in the insurance value chain.

1. Product inventory management / Product definition / Product configuration rules.
2. Underwriting and pricing rules.
3. Bills and invoicing rules.
4. Claims Adjudication rules.

5.1.1. Product inventory management / Product definition / Product configuration rules

Step 1 Identify the business areas and the rule categories relevant to the scenario

Primarily, the product development team works closely with the IT operations to manage the product configuration; however, the other business areas in the insurance value chain also depend on the product rule configurations.

Thus, the selected candidate solutions should not only address the business needs identified for product development, but also the correlations of product development with other areas accessing the product rules.

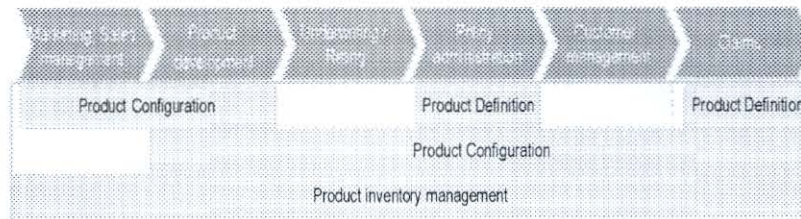


Figure 12 : Implementing Product rules

Determine the candidate solutions

Based on the key business needs for structuring the product rules, 3 different candidate solutions are considered for comparative analysis.

- 1 Enterprise Decision Management tool
 - o Blaze Advisor
 - o Model builder
- 1 Purpose built package with rules features



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- Product Machine from FJA
- Product Accelerator from CSC
- 1 Custom coded solution
 - Java
 - .Net

Determine the best fit solutions based on score card driven analysis

A scorecard based approach is used to rank the competing candidate solutions. The rating for each candidate solution is calculated based on the importance of three key dimensions: agility, complexity, and flexibility.

Agility

The key business need for the product development is to reduce the overall 'time to market' for launching a new product and also to shorten the cycle time to implement any change in the product portfolio.

The candidate solutions are assessed on 6 data points (frequency of change of decision strategy, turnaround time for implementing change, whether it is necessary for the business to get involved to effect changes in decision logic, whether system administrators can effect changes without additional coding), to grade their capability of meeting the 'Agility' need.

The need for agility is assessed to be of 'medium' priority for product management (scored 2.83 on a scale of 5). It is valuable for the business users / analysts to changes the functional rules of the products than that of the developers as the improper technical interpretation of legal verbiage by the developers will increase errors and thus, increase the overall roll out cycle time. The 'Agility' factors, for example, the ability of the business users to simulate effects of the changes made in the product rules before production roll out, reduce the overall cycle time for implementing the business changes or to roll out a new product.



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Dimension	Datapoint	Rating	Weight	Score	Rating Guide
Agility (Need for precision configurability to dynamically manage changes in externalized business logic versus traditional software development cycles for enhancing code)				2.83	
	1 Frequency of changing the decision strategy	3	1		1-> low for static rules that changing less than once per year, 5-> High for changes to be implemented every month or week
	2 Turn-around time for implementing change	1	1		1-> low for quarterly release cycles; 5-> High for changes to be implemented within a week
	3 Need for Business to review or simulate the effect of change prior to install (business cannot go through the codebase) to optimize the decision	2	1		1-> low for cases where business needs not review or simulated the changes such as utility functions like file handling, 5-> High for cases where business has to review and simulate the impact of the changes such as changing the pricing structure or commissions
	4 Need for System administrators to implement the changes without additional coding	1	1		1-> low; where most changes can go through coding cycles by maint. teams 5-> High; cases where most changes need to be addressed by system admins without intervention of developers
	5 Need to precisely manage rule changes including tracing impacts to other rules	5	1		5-> Low, where the rules are few and standalone 5-> High, where rules are organized into flows and rule sets with high number of individual rules
	6 Domain intensive rules making it valuable to be authored by business users/ analysts instead of developers to reduce errors	5	1		5-> Low for simple validation such as data-type checks 2-> High for rules implementing legal verbiage

Figure 13 : Importance of agility for product development rules

Complexity

To configure an insurance product, product managers not only consider the business needs, but also address the regulatory obligations, and the possibility of reusing the existing products and their components. Additionally, the entire process goes through multiple levels of validation and approval. The overall complexity of the product development process is assessed as 'high' (scored 3.67 on a scale of 5 when the complexity of product development is assessed for 6 data points, such as complexity of decision making, transactional volume, impact due to regulatory change, and use of complex decision models to drive decisions, etc.).

The key factors driving complexity for product management rules are the high revenue impact of the decision and large number of atomic rules (a complex rule can be counted as an aggregation of multiple simple rules) to address the product portfolio.



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Dimension	Datapoint	Rating	Weight	Score	Rating Guide
Complexity (Need for Sophisticated decision modeling versus basic condition checks and look-ups)					3.67
1	Complexity of the decisions	3	1	3	1-> low for simple look-ups, 5-> for multiple conditions connected with "and", "or" clauses and conditionals like "IF/ Then" making coding and debugging difficult
2	Transactional volume	3	1	3	1-> low for volumes in the order of hundreds/day; 5-> High for volumes in the order of tens of thousands per day
3	Impact due to regulatory change	4	1	4	1-> low for very few impacts; 5-> High for major changes in decision logic like incorporating additional data points or processing significantly higher volumes
4	Use of complex scoring models to drive decisions	2	1	2	1-> low where not applicable, 5-> High where complex predictive analysis models are used as an integral part of the transaction/ decision processing
5	Cost or revenue impact of the decision	5	1	5	1> Low for no impact 2> High impact such as reduced losses due to error or fraud or loss of customers business to a competitor
6	Large number of atomic rules (a complex rule can be counted as an aggregation of multiple simple rules)	5	1	5	1> Low for less than hundred 5> High for hundreds and thousands

Figure 14 : Importance of complexity for product development rules

Flexibility

Flexibility of the product development rules enables the product managers to implement common features across the products. The importance of 'Flexibility' is evaluated on the basis of 5 data points (gaps between the requirements of insurer and those provided by the candidate solution, custom integration requirements, need for extracting and replicating code from legacy solutions, etc.) and it scores a 'medium' 2.8 on a scale of 5.

Dimension	Datapoint	Rating	Weight	Score	Rating Guide
Flexibility (Need for Generic BRMS versus purpose built package with rules feature or parameterized custom-code)					2.8
1	Gap in Chubb business processes from base functionality provided by purpose built packaged solutions or original custom code design	2	1	2	1-> Low gap not requiring BPR or high package customization or design changes 5-> High gap requiring extensive package customizations and additional custom code or widespread changes in a custom solution
2	Custom integration requirement with existing Chubb proprietary applications	3	1	3	1-> low for stand-alone solutions or complete package implementations 5-> High where Chubb proprietary APIs and message structures are used to stitch together parts of the packaged solution with existing custom applications
3	Need for extracting and replicating functionality in existing legacy code as externalized business rules	3	1	3	1> Low for implementation of new functionality or current manual processes 5> High for legacy modernization projects with minimal functional and business process changes
4	Need to re-use the decision logic across multiple applications	3	1	3	1> Low if the decision logic is to be used only in one application 5> High if the decision logic is to be used by other applications or deployed to new channels or operating environments
5	Need for unique or differentiating decisioning capability not available in industry standard products	3	1	3	1> Low for regulated standardized functions such as financial reporting 5> High for unique or groundbreaking services or products not available with competitors

Figure 15 : Importance of flexibility for product development rules

Medium range agility and flexibility requirements make it a good case for adopting a purpose built package with built in rules features.



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Since it may not be necessary to adopt a highly agile, or highly flexible solution to meet the immediate business needs, significant savings in development and maintenance would accrue from adopting an off the shelf purpose built package.

However, when compared to a custom built solution tailor-made to meet all requirements, there may be a few functional limitations with a purpose built package. This will be an acceptable trade-off since a purpose built package will reduce overall system development costs and involve less development time.

However, a purpose built package with rules features alone may not be sufficient, if the adopted solution is expected to handle complex decision making in terms of complex product definitions and calculations.

An Enterprise Data Management (EDM) solution can supplement the adopted purpose built package to meet the complex decision making needs, such as business rules management, analytic modeling, and decision strategy optimization.

Scenario	Product inventory management / Product definition / Product configuration rules for a standard insurance product		
Agility	Medium	Primary Solution type	Purpose built package
Complexity	Medium	Supporting or Alternative	EDM for complexity
Flexibility	Medium	solution	

Figure 16 : Overall score for product development rules

5.1.2. Underwriting and pricing rules

Identify the business areas and the rule categories relevant to the scenario

Underwriting and pricing rules are used extensively both for new business as well as for renewals and some policy changes. Although the rating based on the actuarial models can be implemented using a specialized rating service / purpose built rating engine, the underwriting guidance remains in the playbooks and policy manuals outside the rating engine. These rules are subject to changes from both internal (e.g., policies, procedures) as well as external (e.g. regulatory, competition) change drivers and on certain cases become quite complex. Manual interpretation and execution of these rules not only increases the direct underwriting costs but also leaves scope for errors and omissions as in the case of adding or modifying endorsements which can result in higher losses or legal compliance issues.

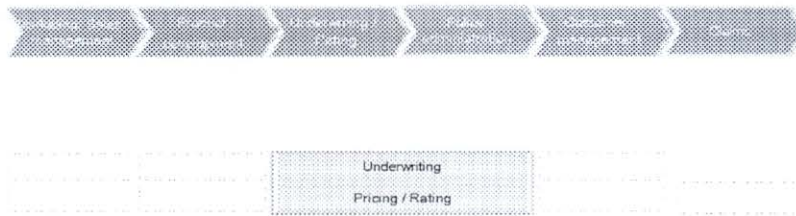


Figure 17 : Implementing Underwriting and Rating rules

Determine the candidate solutions

Based on the key business needs outlined above, three different candidate solutions are considered for



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comparative analysis.

- t Enterprise Decision Management tool
 - o Blaze Advisor
- t Purpose built package with rules features
 - o Extending EXAMPLE Manuscript solutions from Duck Creek to create services for underwriting and pricing
 - o Leveraging rules features in Policy Administration solutions
- t Custom coded solution
 - o Java
 - o .Net

Determine the best fit solutions based on score card driven analysis

A scorecard based approach is used to rank the competing candidate solutions. The rating for each candidate solution is calculated based on the importance of three key dimensions – agility, complexity, and flexibility – to address the underwriting and pricing requirements.

Agility

The key business need for underwriting is the capability of rapidly and cost efficiently adapting to changes in the selection rules, while maintaining consistency and ensuring rapid 'time to market' for implementing changes.

The candidate solutions are assessed on 6 data points (frequency of change of decision strategy, turnaround time for implementing change, whether it is necessary for the business to get involved to effect changes in decision logic, whether system administrators can effect changes without additional coding, etc.) to grade their capability of meeting the 'Agility' need.

The need for agility is assessed to be of '**High**' priority for underwriting and pricing (scored 3.83 on a scale of 5). The key agility requirements are as follows

- t Need for a rules based architecture wherein the underwriting rules could reside and then be executed against both existing and prospective policies
- t Need for a single point of update for business rules to react to market changes, such as competitive price changes, new regulations, adding new underwriting criteria at a future date



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Dimension	Datapoint	Rating	Weight	Score	Rating Guide
Agility (Need for precision configurability to dynamically manage changes in externalized business logic versus traditional software development cycles for enhancing code)				3.83	High
1	Frequency of changing the decision strategy	4	1		4 1-> low for static rules that changing less than once per year; 5-> High for changes to be implemented every month or week
2	Turn-around time for implementing change	5	1		5 1-> low for quarterly release cycles; 5-> High for changes to be implemented within a week
3	Need for Business to review or simulate the effect of change prior to install (business cannot go through the codebase) to optimize the decision	4	1		4 1-> low for cases where business needs not review or simulated the changes such as utility functions like file handling; 5-> High for cases where business has to review and simulate the impact of the changes such as changing the pricing structure or com
4	Need for System administrators to implement the changes without additional coding	3	1		3 1-> low, where most changes can go through coding cycles by maint. teams 5-> High cases where most changes need to be addressed by system admins without intervention of developers
5	Need to precisely manage rule changes including tracing impacts to other rules	3	1		3 1-> Low, where the rules are few and standalone 5-> High, where rules are organized into flows and rule sets with high number of individual rules
6	Domain intensive rules making it valuable to be authored by business users/ analysts instead of developers to reduce errors	4	1		4 1-> Low for simple validation such as data-type checks 2-> High for rules implementing legal verbiage

Figure 18 : Importance of Agility for underwriting

Complexity

The complexity of the underwriting and pricing rules varies with the product and customer segment. For higher volume-lower risk segments such as small commercial bonds, the rules remain relatively simple and the thrust is more towards automating the transactions, whereas the higher risk and low transaction volume segments like a construction bond for a large building, the rules are complex and are geared towards improving the precision for underwriter guidance.

The need for managing complexity is assessed to be of 'Medium' priority for underwriting and pricing (scored 3.33 on a scale of 5). The key complexity requirements are as follows

- 1 Ability to grow the centralized rule-base to thousands of rules.
- 1 Having an effective date in the rules .
- 1 Ability to create variations or exceptions to a rule, based on a wide range of criteria, especially when the rules are rolled out for additional customer segments and products



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Dimension	Datasent	Rating	Weight	Score	Rating Guide
Complexity (Need for Sophisticated decision modeling versus basic condition checks and look-ups)					3.33 Medium
1	Complexity of the decisions	4	1	4	1-> low for simple look-ups, 5-> for multiple conditions connected with "and", "or" clauses and conditionals like "If/ Then" making coding and debugging difficult
2	Transactional volume	4	1	4	1-> low for volumes in the order of hundreds/day; 5-> High for volumes in the order of tens of thousands per day
3	Impact due to regulatory change	4	1	4	1-> low for very few impacts; 5-> High for major changes in decision logic like incorporating additional data points or processing significantly higher volumes
4	Use of complex scoring models to drive decisions	2	1	2	1-> low where not applicable, 5-> High where complex predictive analysis models are used as an integral part of the transaction/ decision processing
5	Cost or revenue impact of the decision	3	1	3	1> Low for no impact 2> High impact such as reduced losses due to error or fraud or loss of customers business to a competitor
6	Large number of atomic rules (a complex rule can be counted as an aggregation of multiple simple rules)	3	1	3	1> Low for less than hundred 5> High for hundreds and thousands

Figure 19 : Importance of complexity for underwriting

Flexibility

Flexibility of the underwriting process enables the treatment of selection rules used to evaluate underwriting decisions as a manageable enterprise resource that can be reused by multiple underwriting teams within Chubb, thereby eliminating the time, cost, and risk inherent in simultaneously reprogramming multiple systems. The importance of 'Flexibility' is evaluated on the basis of 6 data points (such as, gaps between the requirements of insurer and those provided by the candidate solution, custom integration requirements, need for extracting and replicating code from legacy solutions, etc.) and it scores 'high' (3.8 on a scale of 5). The key flexibility requirements are as follows:

- 1 Provide a simple way for analysts to understand and maintain the rules with minimal IT dependence. As the IT teams will promote the rules from test environment to production environment, it will provide the necessary isolation between the roles making changes and the roles implementing the changes.
- 1 Need for separating the business logic from the operational decision system to allow for easy updates to strategic decision framework, policies, and exceptions and to fine tune business policies.
- 1 Ability to deploy the rules to multiple channels including the underwriters, brokers, and agents and even to direct to customers (potential future state).
- 1 Ability to deploy the rules across the lines of business to address potential cross-sell and up-sell opportunities.



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Dimension	Datasint	Range	Weight	Score	Rating Guide
Flexibility (Need for Generic BRMS versus purpose built package with rules feature or parameterized custom-code)				3.80	High
1	Gap in Chubb business processes from base functionality provided by purpose built packaged solutions or original custom code design	3	1	3	1-> Low gap not requiring BPR or high package customization or design changes 5-> High gap requiring extensive package customizations and additional custom code or widespread changes in a custom solution
2	Custom integration requirement with existing Chubb proprietary applications	4	1	4	1-> Low for stand-alone solutions or complete package implementations 5-> High where Chubb proprietary APIs and message structures are used to stitch together parts of the packaged solution with existing custom applications
3	Need for extracting and replicating functionality in existing legacy code as externalized business rules	4	1	4	1-> Low for implementation of new functionality or current manual processes 5-> High for legacy modernization projects with minimal functional and business process changes
4	Need to re-use the decision logic across multiple applications	4	1	4	1-> Low if the decision logic is to be used only in one application 5-> High if the decision logic is to be used by other applications or deployed to new channels or operating environments
5	Need for unique or differentiating decisioning capability not available in industry standard products	4	1	4	1-> Low for regulated standardized functions such as financial reporting 5-> High for unique or groundbreaking services or products not available with competitors

Figure 20 : Importance of Flexibility for underwriting

High range agility and flexibility requirements make it a good case for adopting an Enterprise Decision Management Tool as the primary solution.

Scenario	Product inventory management / Product definition / Product configuration rules for a standard insurance product		
Agility	High		
Complexity	Medium	Primary Solution type	EDM
Flexibility	High	Supporting or Alternative solution	

Figure 21 : Overall score for underwriting rules

Sustaining and improving operational effectiveness are the keys for providing better underwriting and pricing services. Operational effectiveness can be improved by identifying and automating underwriting and pricing in the low -touch insurance segments, thereby freeing up bandwidth for insurance segments that require greater involvement and intervention of underwriters. EDM solution will use analytic models for enabling high-volume, automated decision-making, and impart the desired precision, consistency, and agility in the decision-making process. EDM also helps improving the value delivered by a decision i.e., the decision yield, with each succeeding decision by feeding progressively more data into the underlying predictive models and Decision Support Systems. The choice of EDM will also provide a strategic enabler towards implementing an **Enterprise Policy Hub**.

The following sections detail the score for the individual dimensions



5.1.3. Bills and invoicing rules

Identify the business areas and the rule categories relevant to the scenario

Billing and invoicing rules are used only in the customer management and claims segments of the value chain. These rules are subject to changes from both internal (e.g. policies, procedures) as well as external (e.g. regulatory, competition) change drivers, and on certain cases become quite complex. Manual interpretation and execution of these rules not only increases the operating costs but also lowers customer satisfaction due to higher scope for delays and errors.



Figure 22 : Implementing Bill / invoicing rules

Determine the candidate solutions

Based on the key business needs outlined above, three different candidate solutions are considered for comparative analysis.

- 1. Enterprise Decision Management tool
 - o Blaze Advisor
- 1. Purpose built package with rules features
 - o Leveraging rules features in Policy Administration solutions
- 1. Custom coded solution
 - o Java

Determine the best fit solutions based on score card driven analysis

A scorecard based approach is used to rank the competing candidate solutions. The rating for each candidate solution is derived based on the importance of three key dimensions – agility, complexity, and flexibility – to address the billing and invoicing pricing requirements.

Agility

The agility needs of the Billing and invoicing rules vary with the product and customer segment, and are identified based on customer service and revenue recognition focus. In the illustrative example, the agility needs are assessed as 'Medium' for billing and invoicing (scored 2.17 on a scale of 5). Billing and invoicing decisions are relatively static and provides longer turnaround times for implementing changes (billing cycles)



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Dimension	Datapoint	Rating	Weight	Score	Rating Guide
Agility (Need for precision configurability to dynamically manage changes in externalized business logic versus traditional software development cycles for enhancing code)				2.17	Medium
	1 Frequency of changing the decision strategy	2	1		2 1-> low for static rules that changing less than once per year; 5-> High for changes to be implemented every month or week
	2 Turn-around time for implementing change	2	1		2 1-> low for quarterly release cycles; 5-> High for changes to be implemented within a week
	3 Need for Business to review or simulate the effect of change prior to install (business cannot go through the codebase) to optimize the decision	2	1		2 1-> low for cases where business needs not review or simulated the changes such as utility functions like file handling; 5-> High for cases where business has to review and simulate the impact of the changes such as changing the pricing structure or commissions
	4 Need for System administrators to implement the changes without additional coding	2	1		2 1-> low, where most changes can go through coding cycles by maint. teams 5-> High, cases where most changes need to be addressed by system admins without intervention of developers
	5 Need to precisely manage rule changes including tracing impacts to other rules	3	1		3 1-> Low, where the rules are few and standalone 5-> High, where rules are organized into flows and rule sets with high number of individual rules
	6 Domain intensive rules making it valuable to be authored by business users/ analysts instead of developers to reduce errors	2	1		2 1-> Low for simple validation such as data-type checks 2-> High for rules implementing legal verbiage

Figure 23 : Importance of Agility for Billing and invoicing rules

Complexity

The need to tackle complexity varies with the inherent complexity of the pricing structures, billing plans / options, billing methods, as well as special or exception rules for high value customers or large agents / brokers. In the illustrative example, the rating is 'Medium' for billing and invoicing (scored 2.67 on a scale of 5).

Dimension	Datapoint	Rating	Weight	Score	Rating Guide
Complexity (Need for Sophisticated decision modeling versus basic condition checks and look-ups)				2.67	Medium
	1 Complexity of the decisions	3	1		3 1-> low for simple look-ups, 5-> for multiple conditions connected with "and", "or" clauses and conditionals like "If/ Then" making coding and debugging difficult
	2 Transactional volume	4	1		4 1-> low for volumes in the order of hundreds/day; 5-> High for volumes in the order of tens of thousands per day
	3 Impact due to regulatory change	3	1		3 1-> low for very few impacts; 5-> High for major changes in decision logic like incorporating additional data points or processing significantly higher volumes
	4 Use of complex scoring models to drive decisions	1	1		1 1-> low where not applicable, 5-> High where complex predictive analysis models are used as an integral part of the transaction/ decision processing
	5 Cost or revenue impact of the decision	2	1		2 1-> Low for no impact 2-> High impact such as reduced losses due to error or fraud or loss of customers business to a competitor
	6 Large number of atomic rules (a complex rule can be counted as an aggregation of multiple simple rules)	3	1		3 1-> Low for less than hundred 5-> High for hundreds and thousands

Figure 24 : Importance of Complexity for Billing and invoicing rules



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Flexibility

The flexibility of the Billing and invoicing rules determines the ease of managing the transactions, or switching them to various billing and invoicing plans. Flexibility is also required to address exception conditions for large brokers or agents including integration with their systems. In the illustrative example, the flexibility rating is 'Low' for billing and invoicing (scored 2 on a scale of 5).

Dimension	Datapoint	Rating	Weight	Score	Rating Guide
Flexibility (Need for Generic BRMS versus purpose built package with rules feature or parameterized custom-code)					2 Low
	1 Gap in Chubb business processes from base functionality provided by purpose built packaged solutions or original custom code design	1	1		1 1-> Low gap not requiring BPR or high package customization or design changes 5-> High gap requiring extensive package customizations and additional custom code or widespread changes in a custom solution
	2 Custom integration requirement with existing Chubb proprietary applications	3	1		3 1-> low for stand-alone solutions or complete package implementations 5-> High where Chubb proprietary APIs and message structures are used to stitch together parts of the packaged solution with existing custom applications
	3 Need for extracting and replicating functionality in existing legacy code as externalized business rules	2	1		2 1> Low for implementation of new functionality or current manual processes 5> High for legacy modernization projects with minimal functional and business process changes
	4 Need to re-use the decision logic across multiple applications	2	1		2 1> Low if the decision logic is to be used only in one application 5> High if the decision logic is to be used by other applications or deployed to new channels or operating environments
	5 Need for unique or differentiating decisioning capability not available in industry standard products	2	1		2 1> Low for regulated standardized functions such as financial reporting 5> High for unique or groundbreaking services or products not available with competitors

Figure 25 : Importance of Flexibility for Billing and invoicing rules

Medium range agility and complexity requirements with a low flexibility requirement makes it a good case for adopting a Purpose built package with rules features.

Scenario	Billing and invoicing		
Agility	Medium	Primary Solution type	Purpose built package
Complexity	Medium	Supporting or Alternative solution	
Flexibility	Low		

Figure 26 : Overall score for Billing and invoicing rules

5.1.4. Claims / adjudication rules

Identify the business areas and the rule categories relevant to the scenario

Claims and adjudication rules are used only in the claims segment of the value chain. These rules are subject to changes from both internal (e.g. policies, procedures) as well as external (e.g. regulatory, competition) change drivers and on certain cases become quite complex. Manual interpretation and execution of these rules not only increases the operating costs but also lowers customer satisfaction due to higher scope for delays and errors and impact the company finances in case of critical decisions like determining loss-reserves.





Figure 27 : Implementing Claims adjudication rules

Determine the candidate solutions

Based on the key business needs outlined above, three different candidate solutions are considered for comparative analysis.

- t Enterprise Decision Management tool
 - o Blaze Advisor
- t Purpose built package with rules features
 - o Leveraging rules features in Policy Administration solutions
 - o BPM tools for workflow automation
- t Custom coded solution
 - o Java

Determine the best fit solutions based on score card driven analysis

A scorecard based approach is used to rank the competing candidate solutions. The rating for each candidate solution is derived based on the importance of three key dimensions – agility, complexity, and flexibility – to address the billing and invoicing pricing requirements.

Agility

The agility of the claims adjudication rules vary with the product and customer segment, the nature of loss, and the type of claim. In the illustrative example, the agility needs are rated as ‘**Medium**’ for claims adjudication rules (scored 3.38 on a scale of 5). Claims adjudication rule changes are driven by changes in the product configuration arising out of regulatory changes.



Dimension	Datapoint	Rating	Weight	Score	Rating Guide
Agility (Need for precision configurability to dynamically manage changes in externalized business logic versus traditional software development cycles for enhancing code)					3.38 Medium
	1 Frequency of changing the decision strategy	4	1	4	1-> low for static rules that changing less than once per year; 5-> High for changes to be implemented every month or week
	2 Turn-around time for implementing change	2	1	2	1-> low for quarterly release cycles; 5-> High for changes to be implemented within a week
	3 Need for Business to review or simulate the effect of change prior to install (business cannot go through the codebase) to optimize the decision	3	3	9	1-> low for cases where business needs not review or simulated the changes such as utility functions like file handling; 5-> High for cases where business has to review and simulate the impact of the changes such as changing the pricing structure or com
	4 Need for System administrators to implement the changes without additional coding	2	1	2	1-> low, where most changes can go through coding cycles by maint. teams 5-> High; cases where most changes need to be addressed by system admins without intervention of developers
	5 Need to precisely manage rule changes including tracing impacts to other rules	5	1	5	1-> Low, where the rules are few and standalone 5-> High, where rules are organized into flows and rule sets with high number of individual rules
	6 Domain intensive rules making it valuable to be authored by business users/ analysts instead of developers to reduce errors	5	1	5	1-> Low for simple validation such as data-type checks 2-> High for rules implementing legal verbiage

Figure 28 : Importance of Agility for Claims adjudication rules

Complexity

The complexity of the claims adjudication rules depends on the product and customer segment, the nature of loss, and the type of claim. The complexity also depends on the stage in the overall claims adjudication lifecycle, and type of process involved. In the illustrative example, the complexity rating is 'High' for claims adjudication rules (scored 3.83 on a scale of 5).

There are two key aspects to managing complexity. Firstly, it is necessary to efficiently route tasks to resources best suited to handle them and track the status of the task. Secondly, for certain tasks such as determining loss-reserves, it is necessary to take a decision based on analysis of historical behavioral data, prior decisions, and their outcomes.



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Dimension	Datapoint	Rating	Weight	Score	Rating Guide
Complexity (Need for Sophisticated decision modeling versus basic condition checks and look-ups)					3.83 High
1	Complexity of the decisions	3	1	3	1-> low for simple look-ups; 5-> for multiple conditions connected with "and", "or" clauses and conditionals like "If/ Then" making coding and debugging difficult
2	Transactional volume	3	1	3	1-> low for volumes in the order of hundreds/day; 5-> High for volumes in the order of tens of thousands per day
3	Impact due to regulatory change	4	1	4	1-> low for very few impacts; 5-> High for major changes in decision logic like incorporating additional data points or processing significantly higher volumes
4	Use of complex scoring models to drive decisions	4	1	4	1-> low where not applicable; 5-> High where complex predictive analysis models are used as an integral part of the transaction/ decision processing
5	Cost or revenue impact of the decision	5	1	5	1> Low for no impact 2> High impact such as reduced losses due to error or fraud or loss of customers business to a competitor
6	Large number of atomic rules (a complex rule can be counted as an aggregation of multiple simple rules)	4	1	4	1> Low for less than hundred 5> High for hundreds and thousands

Figure 29 : Importance of Complexity for Claims adjudication rules

Flexibility

The flexibility of the claims and adjudication rules is derived from the ease of routing and managing the process. Flexibility is also required for addressing exception conditions for large brokers or agents, including integration with their systems. In the illustrative example, the flexibility rating is 'Medium' for billing and invoicing (scored 2.8 on a scale of 5).

Dimension	Datapoint	Rating	Weight	Score	Rating Guide
Flexibility (Need for Generic BRMS versus purpose built package with rules feature or parameterized custom-code)					2.8 Medium
1	Gap in Chubb business processes from base functionality provided by purpose built packaged solutions or original custom code design	3	1	3	1-> Low gap not requiring BPR or high package customization or design changes 5-> High gap requiring extensive package customizations and additional custom code or widespread changes in a custom solution
2	Custom integration requirement with existing Chubb proprietary applications	3	1	3	1-> low for stand-alone solutions or complete package implementations 5-> High where Chubb proprietary APIs and message structures are used to stitch together parts of the packaged solution with existing custom applications
3	Need for extracting and replicating functionality in existing legacy code as externalized business rules	2	1	2	1> Low for implementation of new functionality or current manual processes 5> High for legacy modernization projects with minimal functional and business process changes
4	Need to re-use the decision logic across multiple applications	3	1	3	1> Low if the decision logic is to be used only in one application 5> High if the decision logic is to be used by other applications or deployed to new channels or operating environments
5	Need for unique or differentiating decisioning capability not available in industry standard products	3	1	3	1> Low for regulated standardized functions such as financial reporting 5> High for unique or groundbreaking services or products not available with competitors

Figure 30 : Importance of Flexibility for Claims adjudication rules



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Medium range agility and flexibility requirements with a high requirement to manage complexity makes it a good case for adopting a Purpose built package supplemented by EDM for the complex rules. While the core claims adjudication processes and their efficient management can be implemented using the workflows of a purpose built package, EDM can be leveraged for more intelligent and informed decision making based on the analysis of historical behavioral data, prior decisions, and their outcomes, e.g., this can be used for determining the loss reserves.

Scenario	Product inventory management / Product definition / Product configuration rules for a standard insurance product		
Agility	Medium	Primary Solution type	Purpose built package
Complexity	High	Supporting or Alternative solution	EDM for complexity
Flexibility	Medium		

Figure 31 : Overall score for Claims adjudication rules

5.2 Support rules

5.2.1. Predictive analysis

In the insurance value chain, the key business decisions are often taken based on educated guesses, for example, selling an insurance product without knowing how much it will cost, accepting or declining a risk, and if the risk is accepted what unique loss prevention action will be required, etc. The 4 key areas in the insurance value chain – Marketing and Sales management, Underwriting and rating, and Claims – leverage the predictive models to improve the accuracy of such decisions.

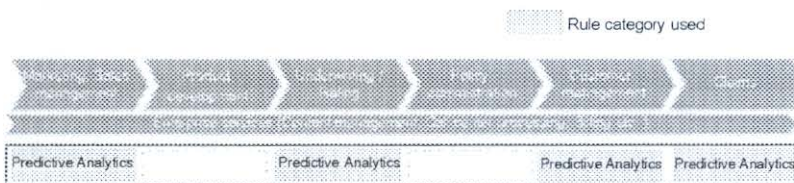


Figure 32 : Using Predictive Analytics

Selecting a Business Intelligence (BI) analytics or an Enterprise Decision Management (EDM) solution to implement decision framework directly depends on the nature of the decisions needed in the particular scenario.

A BI tool is often useful for the business managers synthesizing the past transactional records to determine the strategic intelligence.

For sales and marketing, the product managers can leverage the BI tools to analyze the existing customer information and the product portfolio detail to predict specific outcomes, such as acceptance of a new product to the customer, opportunity to cross sell and up sell, response of the agents / brokers to an incentive plan, etc.

While BI analytics is useful in offline synthesis of past transactional records, the EDM tool can be used for predicting the future behavior and to trigger succeeding actions in real time.



For marketing and Sales management, Underwriting, and Claims, the decisions are often made in real time: which product is best suited the customer's needs? What is the optimal premium to write a particular policy? Or what is the best action to take on a claim? EDM automates such decisions not only to increase the consistency in decisions, but also to improve the overall throughput of the business process.

EDM provides real time predictive analytics and rule management to the business for connecting the operational decisions to the succeeding activities. It provides off the shelf models (decision table, decision tree, score card) that can be leveraged directly to develop appropriate decision services in each of the functional areas.

Leveraging EDM, predictive models for each of those areas can be scientifically developed that emulate real world behaviors to determine the probability of specific outcomes, such as finding out whether a product matched the customer's expectations, determining the optimal premium for a policy, or deciding on the optimal action to take on a claim.

Application developers and other rule components, such as workflow management (WFM) or Business Process Management (BPM) or any purpose build package, will access these models at any point of a decisioning process. Additionally, these models will be fed with the necessary information from the available internal and external data sources to ensure the accuracy of the predictions.

5.2.2. Front end helper and input validation

All the areas of the insurance value chain are tied together by a common element – the data entered by the value chain participants through different access channels or interaction touch-points or obtained from 3rd party services, such as DMV report, Fico Score.

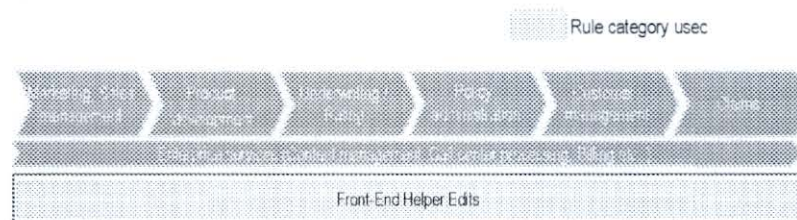


Figure 33 : Using Front-end helper and input validation rules

Front-end helper and input validation rules ensure the correctness and completeness of entered data by performing checks on the size, format, range, etc. to prevent any distortion or inconsistencies in subsequent transactions.

Front-end helper and input validations rules can be implemented using one of the following options, or a combination of options:

1. Custom built application program validation logic
2. Using Inherent features of the Data dictionary, e.g enforcing referential integrity, etc.



3. Using In-built BRMS extensions for validation of customer-facing applications e.g., Blaze SmartForms

The traditional front-end validation mechanism for insurance products is the use of custom built validation logic (usually, for client-side validation), in conjunction with constraints enforced in the data dictionary (usually, for server side validation). This combination is quite effective in handling format checks, range checks, limit checks, presence checks, spelling checks, consistency checks, and ensuring the correctness of batch totals, hash totals, etc. However, one major shortfall of this combination is that it is necessary to manage front-end validation and server side validation separately.

The drawbacks of the traditional mechanism mentioned above can be avoided by using SmartForms (available in Blaze Advisor 6.1)

Smart Forms provide a complete tightly-coupled solution for client side data capture and validation, and server side business rule execution and evaluation. In this approach, the rules responsible for validating data at the front -end are also be able to call (from the action part) any other rule components (functions, decision metaphors, etc.). This enables the instantaneous execution of business decision logic (residing in functions, rulesets, decision metaphors, etc.), immediately after the front end data capture (using customized, interactive, web-based forms) and validation (using front -end edit rules).

Moreover, SmartForm also ensures the availability of the data validated at front-end to the entire rule service, thereby speeding up decision making processes in customer-facing applications.

Choosing an approach out of the above two is driven by the following factors:

1. The desired degree of coupling between user input validation and the business decision logic
2. A cost-benefit tradeoff analysis

In the insurance value chain discussed above, where all the areas coordinate and collaborate with each other, and data consistency and security is of critical importance, SmartForms can be implemented as a front-end rule flow task in Sales process or in Claims, where the validated data are communicated to the other ruleflow tasks for processing and decision logic evaluation. This has the additional advantage of simplifying the web application design, which can be based directly on the imported XML or Java business object model mapping. This approach requires much less time and effort than the design of a custom solution to achieve the same functionality.

Currently, SmartForms comes as an extension to Blaze Advisor 6.1, and requires a separate license. This however appears to be an acceptable input for deciding a trade-off, as the additional costs thus incurred can offset by the significant benefits in development and maintenance of decisioning logic in business applications that SmartForm introduces vis-à-vis custom solutions do.



5.2.3. Workflow and routing

All key areas in insurance value chain coordinate with each other in terms of exchanging information, defining sequence of tasks, assigning roles, managing human interactions as part of the overall insurance business processes.

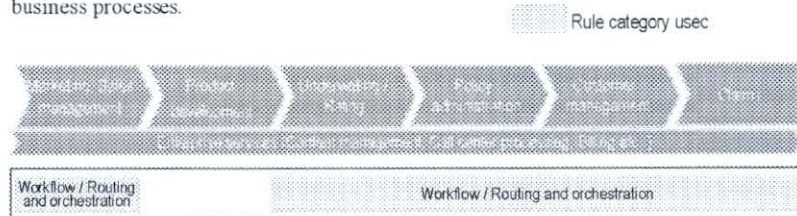


Figure 34 : Using Workflow / Routing and Orchestration

Automating the interaction between the value chain areas requires support for operational transactions, workflow management, and application integration, and in some cases, a sophisticated decision management.

The insurance business processes and the underlying workflows are broadly classified into 3 categories:

- 1 Process intensive
- 1 Decision intensive
- 1 Both process and decision intensive

It is relatively straightforward to implement home grown system for simple workflow orchestration; however, when the workflow requires a lot of complex human-to-human, human-to-system, and system-to-system interactions, it is more cost-effective to purchase such application from one of the vendors and integrate it into department's Business Process.

There are software packages available in Chubb – Metastorm and IBM process server that are purpose built to automate the workflow and the business process for the process intensive scenarios, for example, managing non-premium bearing tasks for the policy administrators.

These products will assist in defining the sequence of tasks, physically moving the documents, sharing information across the involved parties, such as policy administrator, customer, agent and underwriters.

In the decision intensive scenario, where a complex decision triggers a single step routing as part of the process, the enterprise decision management (EDM) can be leveraged alone.

The most challenging case is the third scenario, which is both process and decision intensive. In underwriting or in Claims processing, the overall routing of the tasks are very much dependent on the complex real time decisions. In these situations, an EDM tool can supplement the workflow management or the Business process management solution by providing real time decisioning capability.



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6.0 Reference

Fair Isaac's Blaze Advisor 6.5.3 product documentation.



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